

INSECT BARRIER WITH DISPOSABLE ADHESIVE MEDIA

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Abstract of the Invention

A simple device for use with nectar type bird feeders that effectively prevents ant and other insect contamination. The device uses a disposable media that is coated with a non-drying adhesive. The non-drying adhesive acts as a barrier to the passage of crawling insects. The device is placed interposed between the nectar feeder and the feeder support so as to restrict insects from crawling to the feeder by any route that does not pass through the adhesive coated media. Insects are prevented from contaminating the feeder as they will not cross the non-drying adhesive barrier. The device can be made completely disposable or it may be constructed to accept replaceable adhesive media inserts and/or peel away layers that are conveniently replaced as they become contaminated or dust covered.

Background of the Invention

Nectar, or sugar water type bird feeders are extremely prone to insect, especially ant, contamination. There are numerous products that are commercially available to prevent ants from contaminating nectar type bird feeders. One of the most common barriers is a water "moat" hung above the feeder or designed integrally into the feeder (Ref. U.S. Patents Nos. 4,691,665, 4,901,673, 5,507,249 and 6,463,878). While water moats are effective, they require regular monitoring to fill and clean them. In hot, dry regions, water moats will require daily refilling and they frequently will go dry before the nectar in the feeder is replaced. Water moats work well, but many people find the maintenance and cleaning of them inconvenient. There are also physical barrier means to prevent inset contamination as detailed in my U.S. Patents 5,640,927, 5,806,460 and 6,012,414 for "Nectar Feeder Access Devices". While these devices are very effective, they

also require regular cleaning.

There are also some “home remedy” measures such as putting vegetable oil or petroleum jelly on the feeder hanging cord, or around the perimeter of the feeder ports. There is available commercially a plastic or wooden “bell shaped” device which hangs between the feeder and the feeder hanging point into which the underside, petroleum jelly is applied. These home methods are marginally effective in the short term, but they tend to be very messy, require frequent cleaning, and the oil or petroleum jelly are prone to becoming rancid. The petroleum jelly often melts in hot weather conditions. Unfortunately, the petroleum jelly and/or vegetable oil usually end up on the feeder as they are prone to migration and ,being only marginally effective, especially with larger insects (ants), they can even be tracked back to the feeder. Finally, the petroleum jelly and/or vegetable oil attract dirt which results in the need for frequent and relatively difficult cleaning and the need for regular re-application.

One of the most popular products for the prevention of ant contamination is described in U.S. Patents 4,782,662 4,890,416 and 5,274,950. This product marketed under the name Ant Guard™ is very convenient and effective at preventing ants from getting into nectar feeders. Unfortunately, this product uses a “absorbent disk” treated with the wide spectrum insecticide “Permethrin”. The Permethrin insecticide is very toxic to bees and fish. There are numerous warning messages on the packaging including “CAUTION”, “KEEP OUT OF REACH OF CHILDREN”, “ENVIRONMENTAL HAZARDS - *The Active ingredients in this disk are toxic to fish*”, etc., etc. Due to the fact that this product uses an insecticide barrier, it is simply unacceptable to many bird feeding consumers and many specialty bird feeding retailers. The bird feeding consumer is typically a very environmentally conscious consumer, who prefers a non-insecticide, nontoxic solution to solving their insect (ant) contamination problems.

Summary of the Invention

The object of the present invention is to solve the problem of insect (especially ants) contamination of nectar type bird feeders with a simple, low-cost, and convenient device that requires a minimum maintenance effort and which is environmentally safe and non-toxic. The key to this problem solution is the use of a disposable media, such as paper, vinyl, Tyvek®, Teslin® thin-flexible foam, Pet-G®, PETE, etc. that is pre-treated with a relatively tacky, non-toxic, non-drying adhesive as is commonly found on the better grades of flypaper. This adhesive treated media (the best insect deterring adhesive formulations are colorless, odorless, and are not petroleum based) is highly effective as an insect barrier when placed, with no alternative routes, between the nectar feeder and its hanging point or other mounting structure.

The advantages of using the insect deterring adhesive coated disposable media for the insect barrier device are that it is very convenient, (neat-no sticky stuff to clean up or apply), long lasting protection (months), completely non-toxic, economical (very low cost), has multiple feeding season service capability, and finally, can be manufactured in numerous aesthetically pleasing product configurations. The adhesive media ant barrier device has been tested in an extremely dusty area, and found to be effective for a period of 2 to 4 months which is much longer than the aforementioned methods which can require replacement or maintenance on as frequent as a daily basis. The device or media replacement is simple and neat, there is no associated cleaning. The device will provide multiple season protection by simply including a number of disposable and or replaceable, low cost, adhesively coated media components. User instructions, adhesive free handling zones, and attractive graphics can easily be incorporated onto the disposable adhesive media devices. It is important to note, that ants and other crawling insects only rarely become entrapped in the non-drying adhesive, they most typically pull away and retreat from the barrier before they get completely stuck.

Brief Description of the Drawings

The following drawings are intended to demonstrate the numerous product configurations that the ANT BARRIER WITH DISPOSABLE ADHESIVE MEDIA device might have. These figures are not intended to show all of the potential device embodiments, but rather to demonstrate the design versatility that using a disposable media with a non-drying adhesive coating will allow.

FIG. 1 depicts a top view of the insect barrier that is totally disposable;

FIG. 2 depicts a top view of the insect barrier of **FIG. 1** with a cross section line passing through the center;

FIG. 3 depicts the insect barrier of **FIG. 2** in a side cross sectional view;

FIG. 4 depicts a top view of a sheet of removable insect barrier(s);

FIG. 5 depicts a top and side view of an insect barrier removed from the sheet of **FIG. 4**;

FIG. 6 depicts a side view of the insect barrier pushed over a nectar feeder hanging hook;

FIG. 7 depicts a top and side view of the insect barrier of **FIG. 1**;

FIG. 8 depicts a side view of the insect barrier of **FIG. 1** fitted over a mounting stem;

FIG. 9 depicts an exploded side view of a insect barrier with disposable media with a protective shroud, a stack of replaceable adhesive inserts and the assembly supporting mounting stem;

FIG. 10 depicts a side view of the assembled insect barrier with disposable media of **FIG. 9**;

FIG. 11 depicts a side view of the exploded and assembled insect barrier with disposable adhesive inserts with integral dust shroud;

FIG. 12 depicts an exploded side view of the insect barrier with an inverted cup form disposable media;

FIG. 13 depicts an assembled side view of the device of **FIG. 12**;

FIG. 14 depicts the underside and side view of the disposable, adhesive coated cup form with resilient grommet and feeder hanging cord;

FIG. 15 depicts a side view of a nested stack of the disposable, adhesive coated cup forms of **FIG. 12**;

FIG. 16 depicts an exploded side view of the adhesive coated insect barrier that is adapted to hold a tape roll;

FIG. 17 depicts a side view of the assembled adhesive coated insect barrier with tape roll of **FIG. 16**;

FIG. 18 depicts an exploded side view of a nectar feeder with both the top and bowl having adapted annular surfaces for mounting a disposable, adhesive coated insect barrier;

FIG. 19 depicts an exploded side view of the insect deterring device and disposable media insert adapted for mounting with a feeder supporting pole;

FIG. 20 depicts an exploded side view of the insect deterring device that includes a dust cover, disposable media insert, and a mounting stem with integral baffle plate;

FIG. 21 depicts a side view of the assembled insect deterring device of **FIG. 20**.

Detailed Description:

Referring to **FIG(S). 1** through **4**, there is shown a simple, completely disposable embodiment of the ant deterring device **11** consisting of the disposable media, i.e. paper, vinyl, thin-flexible foam, Tyvek®, etc. with the applied insect deterring (non-drying) adhesive pattern **13**. The device **11** has a center hole cut out as shown at **19** and a clearly identified non-adhesive

coated region 15 for convenient handling. FIG. 3 shows a section view of the device 11 where the bottom layer or media 27 is shown under non-drying adhesive layer 25 and a low surface adhesion contact paper covering 23 that allows for convenient handling. FIG. 4 shows a sheet 31 consisting of a multiple of the ant deterring devices 11. The sheet 31 is perforated to allow for the convenient removal of the devices 11. Although not shown in FIG. 4 the sheet 31 is protected with a top layer of similarly perforated contact (low adhesion paper as is commonly used with self-adhesive labels) paper. This contact paper 23 allows for removing the devices 11 and their subsequent handling without the user coming into contact with the very sticky, non-drying adhesive 13. The protective contact paper 23 is easily removed after pulling the device 11 from the sheet 31.

As shown in FIG(S.) 5 and 6 the device 11 may be interference fitted over the hanging hook 31 of the nectar feeder 33. Alternatively, as shown in FIG(S). 7 and 8 the device 11 may be positioned on a mounting stem 41 at the slightly undercut region shown at 43. The mounting stem 44 has an upper eyelet 45 for attaching the hanging cord 47 or other hanging hardware. The mounting stem 41 has a lower eyelet as shown at 49 for the feeder hanging hook 31 or for use with other feeder hanging hardware.

The ant deterring device 11 is provided with a center hole at 19 for interference fitting with the feeder hanging hook 31 or the mounting stem 41. It is desirable that the device 11 mounting hole 19 have some resilient elasticity to form a continuous contact point or impassable barrier at the mounting point. The vinyl, Tyvek® and thin-flexible foam media may be preferred for the device 11 as they will provide for some elastic expansion and securing friction of the mounting hole 19. An alternative configuration not shown, would use a flexible center grommet or other means to hold the any deterring device 11 directly to the feeder hanging cord 47 or alternative feeder hanging hardware.

Referring to **FIG(S). 9 and 10** there is shown a side view of the exploded and assembled drawing of the ant deterring device consisting of a media mounting stem **59** with a circular platform **63** designed to support the mounting of a self adhesive stack **55** of insect deterring media disks **57**. The stem has an undercut groove **61** adapted for the installation of a removable dust shroud **51** at reduced diameter boss **53**. The ant deterring device has an upper eyelet **67** and lower eyelet **65** for hanging cord **69** and/or other hanging hardware. The stack **55** of adhesive disks has a contact adhesive at the bottom surface shown at **58** to keep it secure on the mounting stem **59** platform **63**. The media disks are configured of a two sided paper with a contact paper surface on the bottom side and a more porous or rougher (paper texture that will hold the non-drying adhesive) surface on the top side. This configuration allows for the entire media stack **55** to stay adhered together until each media disk **57** is removed from the top of the stack. The ant deterring device is long lasting (protected from dust) and easily renewed by pulling the “worn out” insect deterring adhesive disk **57** from the top of the stack **55**.

The **FIG. 11** shows an assembled side view drawing of an ant deterring device **71** with an integral dust shroud **73**. The inside bottom surface **75** of the device **71** is adapted to receive a stack **55** of self-adhesive insect deterring media disks **57**. The stack **55** of insect deterring disks **57** has a self adhesive surface at **58** that holds the stack to the inside bottom surface **75** of the device **71**. The device **71** has upper and lower eyelets for attachment of a hanging cord **69** or other suitable hanging hardware.

Referring to **FIG(S). 12 through 15** there is shown an embodiment of the ant deterring device with mounting stem **79** adapted to hold an insect deterring adhesive coated cup form **77**. The disposable cup form **77** has a coating of insect deterrent adhesive applied in an annular ring as seen at **85**. The cup form **77** has a center hole **87** adapted to interference fit over the mounting stem **79** at the undercut groove **81**. The mounting stem **79** has a circular supporting platform **83**

which acts to support the cup form 77. The mounting stem 79 has an upper eyelet 67 for attaching the feeder cord 69 and a lower eyelet 65 adapted for the feeder hook 31 or other suitable hanging hardware. FIG. 15 shows the nested stacking of the adhesive coated cups. The cup form 77 bottom is configured to protect the insect deterring adhesive 85 from making contact with the inside or outside of the adjacent nested cups 77 as shown at 89. The adhesive coated cups 77 may be manufactured with a roll-folded edge 91 using conventional thermo-forming processes or by any other common cup forming processes. The insect deterring adhesive coated cups are very easily replaced when the adhesive becomes ineffective or the cups become excessively weathered. Although the cup form 77 of the insect deterring device is shown in conjunction with a mounting stem 79, the cup form may have a center hole 87 that is sized to be interference fitted with the feeder hook or hanging cord. As shown in FIG. 14, the cup 77 mounting hole 87 may even be fitted with a resilient grommet 78 or affixed flexible washer to facilitate a friction fit between the device and the feeder hook, hanging cord 69, or other feeder support structure.

Referring to FIG(S). 16 and 17 there is shown an embodiment of the ant deterring device 91 which is configured for the installation of an insect deterring tape roll 99. This tape roll 99 is very similar in configuration to the tape configuration that is used for lint rollers, only it is much smaller and with an applied adhesive that is somewhat thicker or more tacky. The device 91 has an integral dust/rain shroud 95 and an internal cylindrical form 97 over which the cardboard core 109 of the insect deterring tape roll 99 can be interference fitted. The ant deterring device 91 has an upper eyelet 93 and lower eyelet 98. The insect deterring tape roll 99 has serrations at shown at 105 to assist stripping off sections of the used tape. The tape 99 may be manufactured with just an insect deterring adhesive band 101 or the unique combination of the insect deterring adhesive and a region 107 of applied diatomaceous earth. The diatomaceous earth 107 is a non-toxic

mechanical insect killing substance that kills insects by scratching and or piercing the insect's exo-skeleton with the microscopic remains (extremely small shards of silica) of diatoms. The insects with the damaged exo-skeletons simply dry out and die. Diatomaceous earth is non-toxic to virtually all life forms except insects (it is actually used in small quantities in animal feeds as a additive to kill insects). The combination of a non-drying adhesive **101** adjacent to the diatomaceous earth band **107**, on the tape **99**, should result in an dramatically enhanced insect killing effect of the diatomaceous earth. This enhanced effect will result from the exertion of force and action against the diatomaceous earth as the ants (insects) struggle to free themselves from the adhesive band. The combination of insect deterring adhesive placed adjacent to a diatomaceous earth treated region may prove to have numerous other insect killing applications, especially if supplied as a flexible, adhesive backed tape. These other insect killing applications are outside the scope of this patent application.

Referring to the **FIG. 18**, there is shown a feeder with a removable top **111** and nectar reservoir (bowl) **121**. The underside of the feeder top **111** is adapted to receive an annular (center hole at **117**) shaped insect deterring adhesive disk **113** at the underside surface as shown at **119**. This insect deterring disk **113** is protected from rain and dust by the feeder top **111** and will be an effective insect deterrent when the feeder is hung from above by the hook **31**. In a similar manner the feeder bowl **121** has a lower surface adapted to receive an annular (center hole at **117**) shaped insect deterring adhesive disk **113** at the underside surface as shown at **125**. This insect deterring disk **113** is protected from rain and dust by the feeder bowl **121** and will be an effective insect deterrent when the feeder is pole **123** mounted.

Referring to **FIG. 19**, there is shown an insect deterring device **131** configured to interference fit a typical feeder mounting pole **123** as shown at **129**. The device **131** has an underside surface at **130** for contact adhesive attachment of a disposable, insect deterring adhesive

disk 133. The disposable, insect deterring disk 133 has a center cutout 141 an adhesive coating 137, a surrounding application of diatomaceous earth, and untreated region at the tab 139 for convenient handling. The insect deterring device 131 is fabricated from a resilient, weather resistant material such as silicone rubber or flexible PVC.

Referring to FIG(S). 20 and 21, there is shown a section view of an embodiment of the insect deterring device which incorporates a removable rain/dust cover 151 that slides over a central mounting stem 161. The mounting stem 161 has an upper eyelet 165 adapted for hanging cord 169 and a lower eyelet 167 adapted for a feeder hook or other mounting hardware. The mounting stem 161 has an integral platform 163 which is adapted to support a disposable adhesive disk 155 with applied insect deterring adhesive 157 and center hole cutout at 159. This device uses the weight of the rain/dust cover 151 and/or an interference fit between the mounting stem 161 and the rain/dust cover 151 as seen at 153 to hold the disposable adhesive disk 155 in place. The mounting stem 161 has an integral baffle plate 171 to restrict the airflow (and associated dust) up into the rain/dust cover 151. This integral baffle plate 171 will extend the effective service life of the insect deterring adhesive disk 155 in particularly dusty regions.

Although not specifically illustrated throughout this disclosure, it should be noted that the disposable media(s) with one side having an applied insect deterring adhesive coating may be held in place in the various insect barrier devices by use of a contact adhesive applied to the mounting side of the media (as is common with double sided tapes). There are any number of other common means, including clips, resilient bands, frictional contact or groove interference of a cutout hole that may be used to mount and hold the insect deterring media in these devices.

Finally, the application of the “INSECT BARRIER WITH DISPOSABLE ADHESIVE MEDIA” device need not be limited in application to nectar type bird feeders, but may be marketed as crawling insect protection for camper’s foodstuffs when placed interposed between a

tree branch and high hanging food-sack (done to deter foraging bears). Another application for the device would be for an embodiment designed to be used interposed between a tree branch or other structure and a hanging (harvested) game animal, deer, elk, etc.. In both of these alternate applications, the clean, non-toxic “INSECT BARRIER WITH DISPOSABLE ADHESIVE MEDIA” device would be effective for deterring crawling insects and would be completely safe to be near the food and/or game.